



MISSOURI Natural Areas

N E W S L E T T E R

Spring 2007

"...identifying, designating, managing and restoring the best remaining examples of natural communities and geological sites encompassing the full spectrum of Missouri's natural heritage"

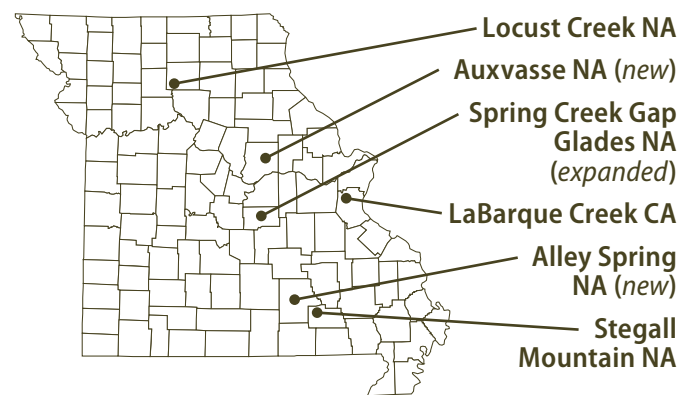
Celebrating 30 Years of the Missouri Natural Areas Program

By Dan Paige, Chair, Missouri Natural Areas Committee

As supporters of the Missouri Natural Areas Program, we can all be proud of what the program has accomplished in the last 30 years to identify and protect Missouri's natural areas. Currently Missouri has 182 natural areas in 78 counties and many are being managed to preserve the values they were designated to protect. In recognition of contributions of the Missouri Natural Areas Program to preserving the natural heritage of our state, Gov. Matt Blunt has designated 2007 as the "Year of the Natural Area."

On this anniversary, it is appropriate to look back at how this program was established. The concept for the first Missouri Natural Areas System was modeled after a successful program that was established in 1951 by the Wisconsin State Board for the Preservation of Scientific Areas. The Missouri Department of Conservation applied this concept to the lands they owned or managed by recognizing small core areas as "natural areas." From 1970 to 1977, 49 areas (ca. 6,000 acres) were recognized. In 1976, a National Science Foundation grant supported the Natural Areas System for Missouri State Parks study on Missouri Department of Natural Resources lands. Widespread interest by a number of organizations including The Nature Conservancy, the L-A-D Foundation, the Missouri Prairie Foundation, the Society of American Foresters, the Missouri Natural Areas Survey, the University of Missouri and others resulted in the formation of the Missouri Natural Areas Advisory Group. This group included many notable persons

AREAS FEATURED IN THIS ISSUE



who contributed greatly to the preservation of natural areas in Missouri and outside of the state.

These two initiatives were the catalyst for the next step that was taken on April 20, 1977. On that date the Missouri Department of Natural Resources and the Missouri Department of Conservation signed a joint agreement initiating a statewide Missouri Natural Areas Program. In time other agencies joined to expand this partnership. Today, those additional key agencies include the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service and The Nature Conservancy. The program serves as an outstanding example of intergovernmental cooperation. Natural areas are owned by state and federal agencies, conservation organizations, local governments, corporations, private citizens, foundations and other ownership associations.

This interagency agreement was a milestone in establishing a foundation for natural resource agencies and conservation organizations to identify and preserve outstanding native landscapes and geological features throughout Missouri. Today natural areas are defined as *biological communities or geological sites that preserve and are managed to perpetuate the natural character, diversity, and ecological processes of Missouri's native landscapes*. Natural areas serve as reference sites for scientific research and ecological restoration, living



MONAC Chair Dan Paige (DNR) speaks at the Governor's Proclamation Ceremony. Others pictured are: Gov. Matt Blunt; Susan Heisel, Director of Missouri Chapter (TNC); and Jeff Staake, Deputy Director of Operations (DNR).
Missouri Department of Conservation, David Stonner

landscapes for interpretation and education, and provide great opportunities for bird watching and other forms of nature-based recreation. The Missouri Natural Areas Program has matured through regional and statewide inventories; publication of terrestrial, aquatic and geologic classification systems; understanding of threats and the role of ecological management; integration of geographic information; and refinement of ecoregional and natural community classification.

This 30th anniversary is also a time to look toward the future. Public opinion surveys show that 84 percent of Missourians support the designation of natural areas to protect the best remaining examples of Missouri's forest, woodland, savanna, prairie, glade, wetland, and cave communities. This is truly reason to celebrate. But statistics also show that the current Millennial Generation (those born between 1980-2000) is less involved in nature-based recreation than were past generations.

One challenge we face is to communicate natural area values in order to continue the support and understanding of current and future generations. How do we compete with game cubes, Xboxes, iPods, and X Games to foster a deep appreciation of the natural world and continued stewardship of our natural resources? The answer is through outreach and education, but it is a challenging market. The Millennial Generation relies on technology such as websites, blogs, podcasts and message boards for information.

One way the Missouri Natural Areas Committee (MONAC) is striving to keep pace is to strengthen its message electronically. The *Missouri Natural Areas Newsletter* is circulated biannually to provide information of both a technical and general nature to build an informed constituency. Soon this newsletter will be available electronically through the web. We will also continue to provide the newsletter by standard mail for those prefer it. Soon a revamped Missouri Natural Areas Program website will provide more information and enhanced accessibility to the inquiring public. Access will be available through the web sites of participating MONAC agencies and constituent support groups.

Is this enough to compete in the information world and to reach the next generation? It is a start. We need to communicate the qualities of perseverance and endurance that characterize the history of the Missouri Natural Areas Program and the natural areas themselves.

The Missouri Natural Areas Committee can be proud of the last 30 years. But to succeed we must look toward the next 30 years, maintaining the momentum of the program and communicating its values to a new generation. ▲

A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

Aldo Leopold, 1949, In *A Sand County Almanac and Sketches Here and There*

Conserving Lacustrine and Palustrine Natural Communities

By Mickey Heitmeyer, Greenbrier Wetland Services, Advance, Mo.

“Lacustrine” and “palustrine” are the technical terms biologists use to classify aquatic ecosystems into “lake” and “wetland” categories, respectively.

Historically, Missouri was blessed with an abundance of natural wetland types distributed throughout the Central Dissected Till and Osage Plains and Mississippi Alluvial Valley ecoregions of the state. Scattered, generally small, wetlands also occurred in some stream valleys and depressions in the Ozark Highlands. In contrast to abundant wetlands, fewer deeper “lacustrine” or natural lake habitats were present; most were oxbows, sloughs and abandoned river channels in larger river floodplains. Today, less than 5 percent of pre-European settlement wetlands and natural lakes remain in Missouri and most of these are modified to some extent.

Most historic wetlands in Missouri were shallow basins that flooded only for short periods in some seasons, usually from late winter to late spring. These “seasonally” or “temporarily” flooded sites were dominated by annual or perennial herbaceous vegetation or bottomland hardwood forests depending on their location, source of water, soils and climate. These wetlands were among the first to be drained and cleared for agricultural production and fewer remnants of these types remain. Larger, more permanently flooded basins were more slowly drained and converted to other land uses. Man-made ponds, lakes and reservoirs now are abundant in Missouri, but they seldom have water regimes, soils, disturbance dynamics or vegetation communities that replicate natural aquatic ecosystems.

Conservation strategies for natural lakes and wetlands have evolved greatly over the past several decades. During the early conservation era of the 1930s-1950s, natural resource agencies and private conservation interests primarily sought to acquire and “protect” wetland/lake areas that were deemed to be the most spectacular or valuable sites for select animal groups, especially waterfowl. Acquisition often was driven by opportunity to purchase specific land tracts, and to provide public hunting areas, rather than strategic securement of critical areas of high biodiversity or imperilment. By the 1960s, wetlands were increasingly modified or destroyed in Missouri, and conservation emphasis began to change from protection of key sites, to enhancement and active management of lands in public ownership. Further, by the turn of the 21st century, most remnant wetlands in Missouri had become small islands of habitats in a sea of modified landscape conditions. Conservation attention subsequently turned to: 1) intensive management of publicly owned wetland areas, usually in Missouri Department

of Conservation (MDC) or U.S. Fish and Wildlife Service (USFWS) ownership; 2) enhancement of privately owned wetlands, often owned by hunting clubs; and 3) restoration of former wetlands, mostly through the Wetlands Reserve Program (WRP) administered by the Natural Resources Conservation Service (NRCS).

Direct management of wetlands and natural lakes in Missouri also changed from the 1930s to the present. Much early management of wetlands was heavily influenced by droughts during the dust bowl days of the 1930s. Managers often thought that wetlands should hold water for most of the year, and they worried that without adequate rains, ducks and other wetland creatures would be homeless. Consequently, following the “Dirty Thirties,” managers sought to capture and store water usually by constructing levees and water-control structures across drainages or in depressions. This management had a predisposed focus on semi-permanent wetlands or natural lakes, and typically there was little concern for uplands and watersheds outside of the immediate wetland boundary. Management evolved in the mid to late 1900s, but retained a focus on structural “dirt-moving” development within the immediate wetland site. Developments and water management also were poorly linked to geomorphology and hydrological attributes of the surrounding landscape. Further, little monitoring or evaluation of management occurred other than periodic surveys of select wildlife or plant groups.

Today, wetland conservation quickly is shifting to embrace new directions in thought and evaluation of systems that incorporate the wetland or lake into the context of entire landscape, watershed, and floodplain ecological processes and structure. Managers no longer can rely solely on site-specific intensive management to provide needed wetland functions and values and resources for all species groups. Ecological changes of special concern are: 1) altered timing, depth, duration and extent of flooding; 2) altered topography and drainage patterns; 3) degraded or reduced diversity and composition of natural vegetation communities; 4) decreased abundance and diversity of resources; and 5) lower diversity and abundance of fauna. Further, the aging and older designs of infrastructure on many conservation areas and increasing demands for sometimes competing public uses create management dilemmas.

New directions in wetland/natural lake conservation are identifying restoration and management options based on: 1) information on geomorphology, soils, and hydrology; 2) a

desire to emulate natural water regimes and historic vegetation communities; 3) understanding of local and regional land use changes; 4) incorporation of scientific knowledge of wetland processes and key plant and animal species; and 5) recognition of the desire for multiple uses. A three-stage process, often referred to as the Hydrogeomorphic Method (HGM) is commonly used to achieve this understanding.

First, the historic condition and ecological processes of an area and its surrounding landscape are determined from a variety of historical information such as geological, hydrological and botanical maps and data (Fig. 1). General Land Office (GLO) maps and notes are especially useful to understand vegetation composition and distribution. A key element of

HGM is developing a “matrix” of understanding of which plant communities occurred in different geomorphological, soil, topography and flood frequency settings. For example, in the Mississippi-Missouri River Confluence Area wet bottomland prairie dominated by prairie cordgrass historically occurred at elevations greater than 417 feet, on relict alluvial floodplain terrace surfaces, on Beaucoup silt loam soils, and between the two- and five-year flood frequency zones.

Second, alterations in hydrological condition, topography, vegetation community structure and distribution, and resource availability to key animal species are determined. This essentially is an honest assessment of current conditions and realities of change.



Figure 1. Map of low swamplands in southeast Missouri in 1903

Little River Drainage District files, Kent Library, Southeast Missouri State University, Cape Girardeau, Missouri.

The Mingo Basin contains about 28,000 acres of low elevation, poorly drained, lands in the Advance Lowlands of southeast Missouri. Despite many alterations, the Mingo Basin remains one of the largest remnant bottomland hardwood ecosystems in the Upper Mississippi Alluvial Valley.

Heitmeyer et al 2006, in *An Evaluation of Ecosystem Restoration and Management Options for the Duck Creek/Mingo Basin Area of Southeast Missouri*.

Third, options and approaches are identified to restore specific habitats and ecological conditions. This foundation of ecological history coupled with a strong dose of reality helps to determine what key elements of system processes and structure potentially can be restored or enhanced and which can not, because of some change. For example, upstream reservoirs, locks-and-dams and levees on Missouri rivers have greatly altered flooding dynamics and river connectivity to floodplain wetlands and lakes in many areas. Here, site-specific restoration may be difficult and conservation strategies must consider larger-scale actions such as working to change reservoir/lock-and-dam water releases and breaching levees in some locations.

The HGM approach to evaluating wetland conservation options and directing strategy is becoming widely adopted throughout the United States. In Missouri, for example, WRP restorations now evaluate historic geomorphology, topography, soils and hydrology as a precursor to designing physical developments and revegetation methods. MDC recently embarked on its Golden Anniversary Wetland Initiative (GAWI) to restore its older wetland areas. The first GAWI evaluation and plan for the Duck Creek/Mingo Basin used the HGM approach as a foundation for decisions (Heitmeyer et al. 2006). A second GAWI evaluation is ongoing for the Ted Shanks Conservation Area. The USFWS, through its Comprehensive Conservation Plans (CCP) and step-down Habitat Management Plans (HMP) is using the HGM approach at Mingo, Swan Lake and Big Muddy National Wildlife Refuges. The Missouri Department of Natural Resources used a modified HGM evaluation for planning at Edward “Ted” and Pat Jones-Confluence Point State Park. The St. Louis District of the U.S. Army Corps of Engineers is sponsoring HGM analyses for the Middle Mississippi River floodplain in partnership with the Middle Mississippi River Partnership Group (a consortium of over 20 conservation groups) and is co-funding the Ted Shanks CA evaluation.

The old days of “buy” and “turn dirt” are fading in wetland conservation circles. Many challenges exist to restore some semblance of natural lacustrine and palustrine systems in Missouri. Alterations in landscape use and topography, hydrological regimes, invasions of exotic species, competing demands for public uses, and changing economic motivations and pressures for private lands are difficult to address, but the HGM approach offers promise in each of these areas. The end product is a more balanced, ecologically-derived, conservation strategy that will help Missouri restore and retain critical parts of these special aquatic ecosystems. ▲

Heitmeyer, M.E., F.A. Nelson and L.H. Fredrickson. 2006. An evaluation of ecosystem restoration and management options for the Duck Creek/Mingo Basin area of southeastern Missouri. Gaylord Memorial Laboratory Special Publication No. 12, University of Missouri-Columbia, Puxico, Mo. 106pp.



Missouri Department of Conservation, Jeff Briggler



Southeastern Missouri's swamps provide ideal habitat for several species of treefrogs, like this green treefrog.

Missouri Department of Conservation, Jeff Briggler

Aquatic Natural Communities and Amphibians

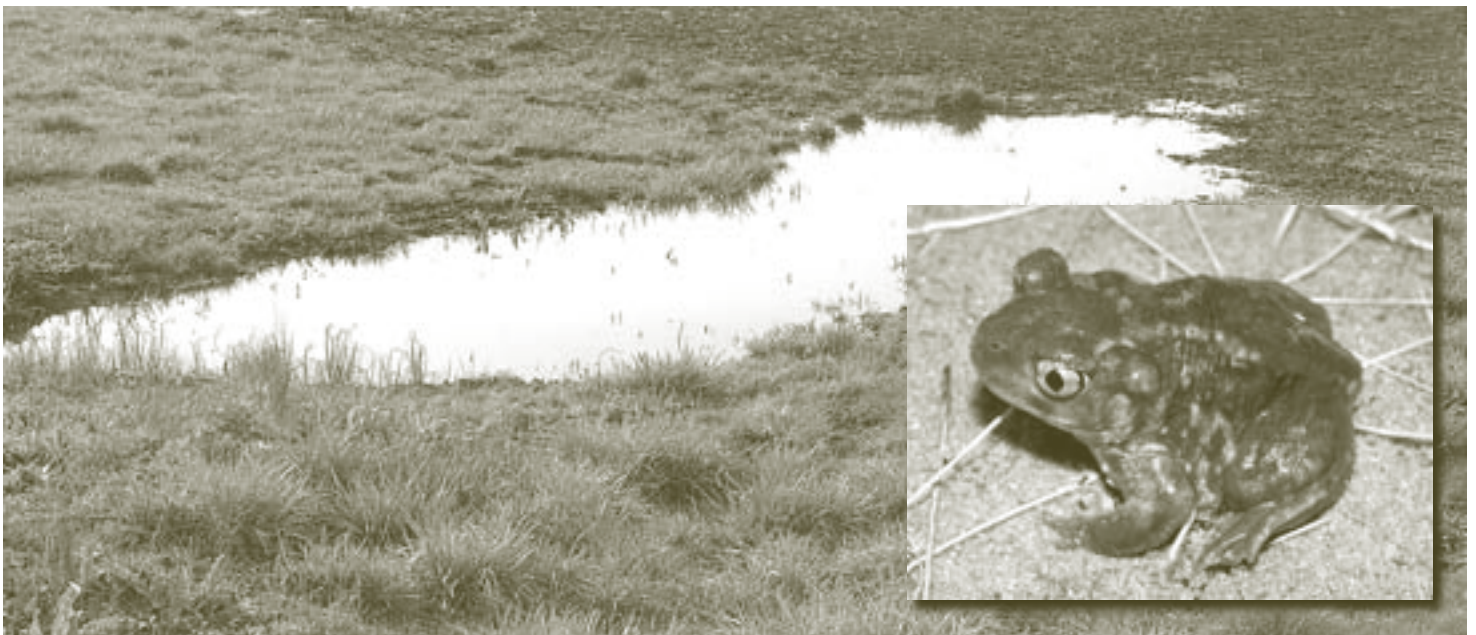
By Jeff Briggler, Herpetologist, Missouri Department of Conservation

A wide variety of aquatic natural communities are embedded within forested and prairie geographic regions across Missouri's landscape (Nelson 2005). These aquatic natural communities vary from lotic conditions (rivers, streams, and springs) to lentic conditions (sinkhole ponds, ephemeral pools, etc.), from deep (rivers and swamps) to shallow wetlands (fens, seeps, and ephemeral pools), from floodplain connectivity (oxbows, sloughs) to isolated wetlands (sinkhole ponds). Amphibian biodiversity within these wetland types depends mainly on the location of wetlands in the state, the surrounding terrestrial natural communities, and presence or absence of predatory fish. In general, the majority of amphibians depend on aquatic habitats to complete their life cycle, either living in water or becoming terrestrial as adults and returning to water to reproduce. Of the 43 species of amphibians in Missouri, all will use at least one of the wetland types for some part of their life history needs. Over the years, I have visited many of these wetland types throughout Missouri, and I would like to share some of my observations regarding amphibian biodiversity within these wetlands.

Riverine wetlands, including marsh, shrub swamp, and swamp, are associated with river floodplains and are seasonal or permanent. These types of wetlands are inundated or flooded frequently and, in most cases, will support fish species.

Predatory fish limit the use of these types of wetlands by most amphibians, but riverine wetlands are important to many species of turtles and snakes. In general, marshes, which are dominated by herbaceous vegetation, are most important for amphibian species using riverine wetlands. The herbaceous vegetation layers provide excellent male calling sites, egg deposition sites, and shelter from predators. In northern Missouri, marshes can be deafening due to the large number of western chorus frogs and plains leopard frogs calling. Even the rare northern leopard frog is found breeding in some riverine marshes. The shrub swamps of southeastern Missouri are dominated by small shrubs (e.g. buttonbush), and are important for several species of treefrogs, like the green treefrog. Riverine wetlands dominated by bald cypress or tupelo gum trees are known as swamps. These more permanent types of wetlands provide habitat for the western lesser siren and the rare three-toed amphiuma.

Sinkhole ponds, including the pond marsh, pond shrub swamp, and pond swamp natural communities, are another wetland type. Sinkhole ponds are associated with karst areas and are formed by the collapse of caves. Like riverine wetlands, pond marshes are dominated by herbaceous vegetation, pond shrub swamps are dominated by shrubs, and pond swamps are dominated by trees. Sinkholes are vital to the majority



Often overlooked is the ephemeral pool, critical for species such as the eastern spadefoot.

Missouri Department of Conservation, Jeff Briggler

In the heart of the Missouri Ozarks, The Nature Conservancy recently acquired 760 acres of rugged oak-pine timberland at the headwaters of the Current River. The acquisition furthers the Conservancy's efforts to protect one of the most biologically significant small rivers in North America through an integrated watershed conservation program. The tract will eventually be added to Montauk State Park

Nature Conservancy
Quarterly Report Spring
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of the amphibian species in the state. Sinkholes can maintain water permanently, seasonally or ephemerally. Diversity of hydroperiod and the typical absence of fish create breeding habitat for over 20 species of amphibians. It is not uncommon to find 300 or 400 spotted salamanders breeding in a sinkhole pond on a rainy night in early spring or to find marbled salamanders guarding their eggs under logs and debris within the dry basin of an ephemeral sinkhole pond in the autumn. Even the rare wood frog sometimes lays tens of thousands of eggs in the late winter along the sunny, shallow side of a sinkhole pond embedded within a forested landscape. Gray treefrogs can be found calling from a buttonbush branch during late spring.

Groundwater seepages, including fens and seeps, are great locations to find amphibian species. Constant water supply makes fens and seeps attractive to amphibians seeking refuge during dry summer months, especially lungless salamanders like the dark-sided salamander, long-tailed salamander, southern red-backed salamander, Ozark zigzag salamander and four-toed salamander. The four-toed salamander, a glacial relic, likes to deposit eggs in moss beds along the water edges of fens and seeps. Very few salamanders occur in the prairie regions of the state, but glacial fens in northern Missouri have a wide variety of frogs, including large numbers of cricket frogs and plains leopard frogs.

An often overlooked community is the ephemeral or temporary pool. Many of these pools are shallow (< 20 inches), small (typically < 0.5 acres), and hold water only during the wetter months of the years. These wetlands are vital to the persistence of numerous amphibian species in the state. Historically, ephemeral pools were created by bison wallowing in the soil, uprooted trees, and low spots in fields and flat ridges that were flooded. In the same way that prairies are considered the most at risk terrestrial natural community by many biologists, herpetologists view ephemeral pools as the most endangered aquatic natural community. Numerous amphibians evolved to survive in these fishless, temporary wetlands. Because of the loss of ephemeral pools throughout Missouri and other states, many species that rely on these wetlands to breed are listed as species of conservation concern. Two rare species, Illinois chorus frog and eastern spadefoot, surface

from beneath the sand in southeastern Missouri to deposit eggs in flooded fields in March. The Great Plains toad and Plains spadefoot breed in ephemeral wetlands within the Missouri River floodplains. The northern crawfish frog surfaces in late winter from its crayfish burrow located in the prairie to find and locate a mate near an ephemeral pool.

Amphibians also use river and stream natural communities. The amphibian community varies along a gradient related to the order size of the river. The upper reaches of a watershed are places to find salamanders, such as western slimy salamanders, Ozark zigzag salamanders, dark-sided salamanders and four-toed salamanders to name a few. These upper watersheds have a diversity of amphibians similar to fens and seeps. As you proceed downstream and water depth increases, the amphibian biodiversity shifts to species better adapted to co-exist with predatory fish. Many anuran species, such as cricket frogs, toads, bullfrogs and green frogs, are often found along the water's edge. Within the water there will be several species of aquatic salamanders that have adapted to the biotic and abiotic conditions of larger rivers and streams. Mudpuppies and hellbenders are two species found in these riverine conditions. Mudpuppies are often captured on hook-and-line by anglers in the Mississippi River, Missouri River, Black River and numerous impoundments (Lake of the Ozarks, Norfolk Reservoir, etc.). However, hellbenders are more restricted to clear, cold water habitats of several Ozark streams. Due to the limestone/dolomite geology and numerous cold water springs flowing into the Ozark streams, hellbenders were once very abundant in Missouri. Hellbender numbers have decreased dramatically over the past 35 years. Many of the Conservation Opportunity Areas (COA) in the Ozarks have addressed the recovery needs of hellbenders in Missouri. One example, the Upper Gasconade River Hills COA, defines recovery goals for conserving hellbenders in the Gasconade River. The section of the Gasconade River within this COA once harbored hundreds of hellbenders. In the 1980s, 379 hellbenders were captured within this COA. Surveys conducted in this same area during 1998/1999 and 2005/2006 captured 33 and 16 hellbenders respectively. Some conservation strategies and inventory priorities identified in this COA address the need for improved water quality by restoring riparian corridors, controlling erosion problems, and possibly providing alternative water sources for livestock that enter the river. To better understand the impacts of water quality, blood samples were taken from 10 hellbenders within this COA to examine the health, hormone levels, and selective heavy metal accumulations. Improving watershed health should not only help in the recovery the hellbender, but also the recovery of declining mussel and fish populations so that future Missourians can enjoy our beautiful Ozark streams for years to come. ▲

Nelson, P.W., et al. 2005. The Terrestrial Natural Communities of Missouri, Revised ed. The Missouri Natural Area Committee, Jefferson City, Missouri. 550 pp.

Aquatic Invasive Species: Floral and Faunal Threats to Natural Communities

By Brian D. Canaday, Invasive Species Coordinator, Missouri Department of Conservation

After habitat destruction, invasions of introduced species pose the greatest threat to native species and their ecosystems worldwide. The introduction of invasive species in the United States has been a concern since the 1800s. Costs including control and management, lost or impacted markets, and impacts to tourism associated with these invasions in the United States exceed hundreds of billions of dollars annually. Studies have shown that approximately 46 percent of the species on the federal threatened and endangered list are at risk as a result of invasive species. Once established, invasive species displace native species, degrade ecosystems and have the potential to cause human health problems.

Invasive species are introduced (usually by humans) from another region or continent. Invasive species are a serious problem for our precious natural resources and economy because they are aggressive, competitive and adaptable to their new environments. Recent media attention is focused on new species introductions and the problems of the latest imported threats. However, it's our observation that many reports exclude important details about how many of these invaders are being spread, and what you can do to combat the problem.

The following is a short list of aquatic invasive species currently in Missouri as well as a listing of those species that are likely to invade (i.e., ones we need to watch for):

Aquatic invasive species currently found in Missouri

- | | |
|----------------------------|----------------------|
| ■ Eurasian watermilfoil | ■ Purple loosestrife |
| ■ Dotted duckweed | ■ Brittle naiad |
| ■ <i>Daphnia lumholtzi</i> | ■ Zebra mussel |
| ■ Common carp | ■ Grass carp |
| ■ Bighead carp | ■ Silver carp |
| ■ White perch | ■ Asian clam |

Possible aquatic invasive species threats to Missouri

- | | |
|------------------------|-------------------|
| ■ Water hyacinth | ■ <i>Hydrilla</i> |
| ■ New Zealand mudsnail | ■ Rusty crayfish |
| ■ Northern snakehead | ■ Black carp |
| ■ Ruffe | ■ Round goby |
| ■ Quagga mussel | |

In addition to the fish, crayfish and aquatic plant species, the Conservation Department is tracking over 25



Zebra mussel

Missouri Department of Conservation

potentially invasive species of reptiles and amphibians; generally thought to be a low threat because of climatic conditions.

As biologists, we tend to focus our attention on Missouri's bountiful streams, lakes, ponds and marshes. Missouri is blessed with a rich and diverse native aquatic fauna. Along with hundreds of native aquatic and wetland plants, over 240 species of fish, 65 species of mussels and at least 33 species of crayfish call Missouri home. Invasive species are certainly invading our waterways at an increasing rate. These invasions have the potential to eliminate native species from waterways, negatively impact food chains, and harm prized fisheries. As we track these invasions and their impacts, we have spent much of our time

learning about the causes, potential impacts and possible solutions. This is a complex issue, and there is much more for us to learn. However, we are here to report some good news. You can play a critical role in preventing the spread of aquatic invasive species in Missouri by following a few simple steps:

- Inspect your equipment, waders, boots, nets, boats and trailers thoroughly, and remove any trash, mussels or aquatic weeds before leaving any water body.
- Drain water from buckets, sample jars, motors, live well, bilge and transom wells, and any other water from your boat and equipment before leaving any water body.
- Dump leftover bait on land, far away from water.
- Rinse your boat, trailer and equipment, waders, boots, etc. thoroughly with a hard spray of HOT (104 degrees Fahrenheit) water, like that found at a self-serve carwash.

- Dry everything thoroughly in the hot sun before using it again.
- Several Missouri Stream Teams are helping by monitoring lakes and streams for zebra mussels and other aquatic invasive species. If you would like to join the effort, call (800)781-1989 or visit the Stream Team web-site at www.mostreamteam.org.

By working together we can prevent the introduction and spread of aquatic invasive species in Missouri. It is probably unrealistic to think that we can totally halt the spread of aquatic invasive species in our state, even if we implemented all the preventative measures we've discussed. However, working together, those of us who cherish our waterways for their recreational, aesthetic, health and economic benefits can make a big difference. Every angler, boater, pet owner and pond owner will play an important role. Educating our family, friends and coworkers will also help. If we all do our own small part, we might be able to keep Missouri waters free of invasives. ▲

Rogers Creek in the Stegall Mountain Natural Area

By Dan Drees, Wildlife Management Biologist, Missouri Department of Conservation

Almost seven miles of the headwaters of Rogers Creek were designated as the seventh Missouri natural area in 1971. When it gets too hot to fish, and the best float streams become packed with people, Rogers Creek is a refreshing oasis of beauty, biodiversity, and solitude. The alluring spring-fed waters of this pristine creek provide a cool natural haven from both the heat and the crowds.

In 1993, Rogers Creek Natural Area was included into the new 5,387-acre Stegall Mountain Natural Area, the third largest designated natural area in Missouri. Of this 5,387-acre natural area, there are 3,152 acres (or 59 percent) in the Rogers Creek watershed.

The natural area portion of Rogers Creek has a watershed of 7,986 acres. Fortunately 95 percent of this watershed is owned by the Missouri Department of Conservation, two percent is owned by The Nature Conservancy, and three percent is owned by responsible private landowners who only manage for timber production.

Surprisingly, there are only five houses in the natural area watershed. All of these homes are on the crest of ridges

at the outer edge of the watershed. These private lands are all in native vegetation except for their small mowed lawns. Also there are no hard-surfaced roads in the watershed.

Rogers Creek starts 1,000 feet upstream of the road to Stegall Mountain as two small springs, each emerging in the bottom of small adjoining drainages that share the same main valley. Numerous smaller springs, seeps, and a fen quickly contribute enough water to compose this perennial babbling creek. Next to the fen the creek crosses the gravel road leading to the Stegall Mountain fire tower.

This headwater portion of the creek has an exceptionally abundant population of a species of snail-case caddisfly that attach themselves to the creek gravel. These detritus-feeding stream cleaners are extremely sensitive to poor water quality. Their abundance is a clear indicator that Rogers Creek is born of clean water.

A thousand feet downstream from the Stegall Mountain road, Rogers Creek cascades through a small shut-in of igneous porphyry rock the color of Bordeaux wine. Although this shut-in is humble in size, compared to others in the Ozarks, it provides an acoustic delight. I



The spicebush swallowtail butterfly and the silver-spotted butterfly can easily be found feeding on blooming buttonbush in mid-summer. Missouri Department of Conservation, Dan Drees

find its melodious flow both soothing and invigorating. It is the type of place where you want to sit down and savor the tranquility of the setting before looking for another interesting discovery.

My favorite time to explore creeks is summer. However, the dominant shrub along Rogers Creek is Ozark witch hazel (*Hamamelis vernalis*), which blooms January, February and March. The frost-proof and fragrant flowers unfurl on mild winter days. Although the narrow half-inch long flower petals are small, they are very colorful. The flowers are usually a mixture of deep yellow and maroon. For those of us who start yearning for spring as soon as the Christmas decorations are put away, seeing and smelling fresh sweet-scented wildflowers in January is a revitalizing experience.

Another common Rogers Creek flowering shrub is the mid-summer blooming buttonbush. The white globe-shaped flower clusters are very rich in nectar. They are especially attractive to swallowtail butterflies, which are so busy enjoying their sweet feast that they typically ignore approaching people.

The Ozark Trail crosses Rogers Creek in one spot but there are no trails that provide good access to the creek. Considering the extremely small number of visitors to

Rogers Creek, the creek itself makes the best trail, provided you wear either sturdy river shoes or waders. As much as I advocate for bringing children to Ozark streams, I would be hesitant to bring them to Rogers Creek. Its rugged character makes it best suited for exploration by agile adults or teens.

So how do you get to Rogers Creek? First find your way to Peck Ranch in the northwest corner of Carter County by either Highway H or P. Gravel roads from both highways lead to the Peck Ranch headquarters where an outside brochure rack has basic maps of the area. To better navigate your way around this vast remote area, I recommend obtaining both the Stegall Mountain and Van Buren North topographic maps before leaving home.

At the Peck Ranch headquarters, enter through the gate on Road #1 and travel it for 4.6 miles down the Mill Creek valley until you will see a 6-inch square wood post with the letter B engraved in it at a road intersection. Stay left, and go an additional 0.2 mile and you will cross a dry gravelly creekbed. When the Road B crosses the creekbed it goes up a steep hill. Continue another 1.3 miles from the dry creekbed, and you will see a small wood signpost where Road 13 intersects with Road B on the left. Continue another 1.3 miles to Rogers Creek.

Two articles in the January 2007 issue of "Natural Areas Journal" address ecological monitoring programs. The first, by Carolyn G. Mahan et al, presents lessons learned from Shenandoah National Park; the second, by Lloyd W. Morrison, assesses the reliability of ecological monitoring data. Consideration of these lessons and assessments may save you much time, money and frustration.....

In Natural Areas Journal Vol. 27, No. 1, January 2007

Your arrival at the downstream section of the Rogers Creek portion of the Stegall Mountain Natural Area means you are an adventurous, persistent and skilled explorer who is far from civilization. From here you can explore downstream for 1.3 miles before Rogers Creek reaches the east boundary of Peck Ranch. This is my favorite section of the creek, especially during July and August.

Initially, the downstream section of the creek pours through chutes of cobble-sized rock. However, within

50 yards the creekbed returns to the mixture of gravel and sand that characterizes most of the creek. The creek rapidly alternates between short pools up to 5 feet deep and shallow riffles.

This portion of Rogers Creek is known to have 25 species of native fish, but very few of them grow large enough to take a lure and no bass have been collected during sampling. Since this natural area is closed to fishing, the main incentive that people have for wading the creek is simply to explore its wildness.

Although bluffs are scarce on the upper 5.5 miles of Rogers Creek, there are several small dolomite bluffs along this downstream section. This added variety in structure enhances the variety of wildflowers that are found blooming along the creekbank. The peak bloom of creekbank wildflowers occurs in August and September. Brown-eyed Susan, blue lobelia, cardinal flower, and grass-of-Parnassus are commonly seen on this section.

Whatever time of year you can get away, I hope you discover this secluded creek to be a peaceful refuge, where the beauty of nature can infuse the soul with colorfully-intricate wildflowers, melodic bird calls and clear rippling water. ▲



Observant visitors to Rogers Creek might see a spawning pair of hornyhead chubs, surrounded by red-bellied dace.

Dr. William Roston



LaBarque Creek cascades over this small sandstone waterfall, a cool site in July.

Missouri Department of Conservation, Tracy Boaz

The LaBarque Creek Watershed

By Mike Arduser, Natural History Biologist, Missouri Department of Conservation and Kevin Meneau, Fisheries Management Biologist, Missouri Department of Conservation

As the juggernaut of urban sprawl continues its assault westward from St. Louis, wild places become increasingly difficult to find. Landscapes here are disturbed and fragmented, if not destroyed altogether, and provide habitat for only a limited suite of species. The impact on streams has been staggering—most are glorified stormwater ditches with little biological integrity. All the more surprising, then, that just an hour's drive from the Arch lies an Outer Ozark Border gem—the LaBarque Creek watershed.

Thirteen square miles (8,392 acres) of rugged, forested hills and steep, narrow valleys, canyons, bluffs and shelter caves carved into St. Peter sandstone, the LaBarque Creek watershed sits out of the way, almost unnoticed, in northwestern Jefferson County. The topography is dramatic, a product of time and the elements working on the unusual geology. Saint Peter sandstone varies from extremely friable “sugar rock” to more cemented, resistant strata capped by dolomite, and as a result nearly

two-thirds of the land area has slopes of 15 percent or greater. LaBarque Creek itself, a relatively undisturbed 6.4 mile-long fourth order Ozark Border stream, quietly gathers its supporting tributaries and slips seamlessly into the Meramec River, 42 miles above its union with Mississippi.

The integrity of the watershed is reflected in the clear waters of LaBarque Creek. At least 42 species of fish have

The Natural Areas Association is an international organization dedicated to advancing the preservation of natural diversity. The Association works to inform, unite, and support persons engaged in identifying, protecting, managing, and studying natural areas and biological diversity across landscapes and ecosystems.

To learn more and to join, go to www.naturalarea.org

been identified in the creek through the Conservation Department's RAM (Resource, Assessment and Monitoring) survey efforts, including a number of fairly conservative species like the silverjaw minnow (*Notropis buccatus*), banded sculpin (*Cottus carlinae*), greenside darter (*Etheostoma blennioides*) and hornyhead chub (*Nocomis biguttatus*). This diversity is almost three times greater than that of any of the 15 other tributaries of the Meramec River below LaBarque. In addition, a significant number of the fish in the creek are long-lived species, indicating a relatively unchanged disturbance regime. IBI scores (Index of Biological Integrity, a measure of aquatic biodiversity) average slightly above 77, indicating a high-quality aquatic community. This level of aquatic biodiversity and richness in a stream so close to St. Louis is unique.

An impressive variety of terrestrial natural communities exists in the watershed. Small sandstone glades, cliffs (moist and dry) and talus are numerous, and small acid seeps and forested fens occur in a few places. Sandstone forest (dry and dry-mesic), dry-mesic loess/glacial till forest, sandstone woodland (dry and dry-mesic), and dry-mesic limestone/dolomite woodland communities are extensive. LaBarque Creek is buffered for much of its length by a streambank community with rich spring wildflower displays in places, and frequent sandbars and sandbanks. Many neotropical migrants breed in the watershed, including wood thrushes, Acadian flycatchers, wood pewees, worm-eating warblers, ovenbirds, yellow-throated vireos, summer tanagers and great-crested flycatchers.

The watershed is also a refuge for rare and habitat-specific plants, including some species of conservation concern. The deep, cool sandstone canyons and wet, shaded bluffs provide microhabitats that support populations of a number of northern species near the southern edge of their distributions, including mosses (*Sphagnum fallax*, *S. magellanicum*), clubmosses (*Huperzia lucidula*, *H. porophila*, *Lycopodium dendroideum*), ferns (*Cystopteris tenuis*), and vascular plants (*Sullivantia sullivantii*). Here these species thrive, sheltered from the extremes of Missouri's climate.

But the Conservation Department isn't the only advocate for the LaBarque Creek watershed. Many landowners appreciate its natural character and are acting to conserve it. Watershed planning efforts initiated by MDC, and involving multiple stakeholders, are nearing completion. This effort has spawned a landowner stewardship committee and a Stream Team: they have already organized and conducted honeysuckle removals, riparian corridor plantings, and water quality monitoring. Landowner-planned events for 2007 include aquatic invertebrate training and monitoring, hosting a second LaBarque Creek festival, visual stream habitat surveys, and several plant identification walks led by volunteers from The Webster Groves Nature Study Society and The Missouri Native Plant Society.



Stable aquatic habitats, such as those along the Wild Canid Research and Survival Center property, are the key to LaBarque Creek's impressive fish community biodiversity.
Missouri Department of Conservation, Kevin Meneau



LaBarque's landscape is peppered with sandstone bowls formed by headwater tributary streams.
Missouri Department of Conservation, Kevin Meneau

While a significant portion of the watershed is in public ownership (Young and LaBarque Creek conservation areas, totaling about 1500 acres), or held by entities sensitive to LaBarque's natural resources, this alone will not protect the natural quality and function of the watershed and its aquatic and terrestrial biodiversity. The future of LaBarque rests with its landowners, who will have to find a balance between their material needs and desires, and the quality of life that drew them to the watershed in the first place. ▲

Locust Creek Natural Area: Rewards and Challenges for a North Missouri River Environment

By Ken McCarty, Chief, Natural Resource Management Section, Missouri Department of Natural Resources

Riverine wetlands are the most difficult natural areas to preserve. Seldom does water flow through them in patterns resembling that of their native natural forms. Few retain complete links to their historic plant and animal communities, or the physical environment and hydrology that would allow restoration of those communities. Perched on their floodplain fragments, isolated from each other and either separated from or squeezed into narrow corridors with their rivers, their water comes from far beyond their boundaries. Along the way, flow is modified in every way important to form and function, such that their hydrology can only be that built into the surrounding cultural landscapes. To this their composition inexorably changes. Yet there is unbreakable continuity between the hydrology within and without, so

corrective actions elicit reactions beyond their boundaries. Sure, natural wetlands exist, but they are dynamic wannabes locked to static parcels of land where ecological changes are driven by externally engineered events.

Given all the challenges impacting native wetlands, places like Locust Creek Natural Area and its surrounding communities should not exist. But within Pershing State Park, that includes this natural area, mature mesic bottomland forest hugs a meandering north Missouri river for five heavily timbered miles. Where on humid June evenings frog choruses pulse from tannin-stained backwaters of the wet bottomland forests alongside, with whole new suites of birds greeting one who wades across to find the willow-lined shrub swamps hidden beyond. Or where thickets of young cottonwoods and



Floods have pushed mile-long drifts of logs into the bends of the Locust Creek NA.
Missouri Department of Natural Resources, Ken McCarty

When the range of natural variation in a system is reduced, the system loses resilience...therefore the “Golden Rule” of resource management should be to strive to retain critical types and ranges of natural variation in ecosystems.

C. S. Holling and Gary K. Meffe, 1996. In *Command and control and the pathology of natural resource management*. *Conservation Biology* Vol. 10(2): 328-337

The heritage of a large, still meandering stream is preserved within Locust Creek NA.

Missouri Department of Natural Resources, Ken McCarty



pin oaks may be parted to reveal one of Missouri's largest surviving wet prairies, nearly 2 miles of cordgrass and wild iris at its longest dimension—all that's left of a prairie stretching nearly 100 miles upstream into Iowa in early historic times. Within this lie marshes thick with river bulrush, and natural oxbow lakes. Then there is the stream itself, still possessing one of north Missouri's most complete native fish species assemblages. The heritage preserved by Locust Creek Natural Area is nearly every kind of riverine community characteristic of stream valleys in the historic glaciated plains, in its native context and with its ecology driven by direct contact with a large, still meandering stream.

So what are the challenges to preserving such a place? Floods have pushed mile-long drifts of logs into the bends of the natural area, routing untold tons of sediment across the backwaters. These have filled marshes and shrub swamps, and buried distinctive plant communities such as the mesic prairie slough where the park's only known pale green orchid population grew. A sediment fan is gradually working its way downstream from the end of channelization at the park's north border, filling sloughs and diminishing aquatic diversity in the north one-third of the natural area. Eighty years of levee-confined floodwater has elevated the upper floodplain's east half by 12 feet, and a drainage ditch is headcutting its way north through the farmed west side to intercept the entire base flow of Locust Creek. If this happens, the park and natural area will lose its river. Deer densities as high as 100 per square mile have been recorded, enough to significantly influence plant communities and recoveries from sedimentation events. The wet prairie is very small to be safe haven for one of Missouri's three remaining populations of massasauga rattlesnake. Should we continue?

It is a tribute to the rarity and significance of Locust Creek Natural Area that so many have done so much to

protect its future. The Department of Natural Resources has purchased land that broadens the park's upper end, and is now growing a forested sediment filter to protect the downstream aquatic life and core wetlands. They have also funded flow modeling studies, and spent over one half million dollars removing logjams in a way that maintained natural river shape and dynamics but stopped the sediment outpouring across the marshes, forests and prairie. Teams from the Conservation Department, Natural Resources Conservation Service and Missouri Transportation Department have planned and are funding measures to slow the head-cutting problem. The U.S. Fish and Wildlife Service is brokering a deal to provide the land needed to provide a permanent fix to the Locust Creek stream piracy problem, that will add 200 acres of forested bottomland to the park, and they have provided studies of the park's rare massasauga rattlesnakes. The Natural Resources Conservation Service has worked with private landowners to develop an adjacent wetland reserve tract that benefit and enlarge the parks natural systems, including the wet prairie and massasauga rattlesnake habitat. Prescribed fire sustains park prairies and marshes, and studies catalog aquatic diversity related to sediment deposition in different reaches of the stream.

Most who visit Missouri natural areas go there to experience and appreciate nature in its historic forms. Perhaps it is well that most are never encumbered by knowledge of the threats or behind-the-scenes activity required to protect areas they consider well sheltered on public lands. But professional resource managers also appreciate the significance of the natural area designation. It brings focus to the most significant remnants of our native natural heritage, in ways that leverage partnerships and sometimes extraordinary effort to ensure their continued viability. Nowhere is this truer than in the fragments of dynamic systems such as wetlands. ▲

Recent Natural Area Designations by the Missouri Natural Areas Committee—Spring 2007

By Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation

With a 652-acre addition to the original 40-acre Spring Creek Gap Glades Natural Area, and two new natural areas—the 795-acre Alley Spring Natural Area and the 110-acre Auxvasse Natural Area—the total acreage in the Missouri Natural Areas System has increased to 62,360 acres on 182 natural areas. These areas were approved by the Missouri Natural Areas Committee in January 2007 and by the Missouri Conservation Commission in April 2007.

The 795-acre **Alley Spring Natural Area** in Shannon County contains Alley Spring, the seventh largest spring in the state, and its associated spring branch. Alley Spring discharges up to 80 million gallons per day. This natural area contains Branson Cave, one of the most biologically diverse in the state, with seven troglobitic (cave-dependant) species, including the



Alley Spring is the seventh largest in the state, discharging up to 80 million gallons a day, and is the centerpiece of the Alley Spring NA.
Missouri Department of Conservation, Mike Leahy

rare grotto salamander (*Typhlotriton spelaeus*). Alley Spring Natural Area features some of the highest quality old-growth shortleaf pine—white oak woodlands (dry and dry-mesic chert woodlands) known in the Ozarks. The area contains five species of conservation concern: star duckweed (*Lemna trisulca*), net-spinning caddisfly (*Ceratopysche piatrix*), grotto salamander, Salem cave isopod (*Caecidotea salemensis*) and the serrated cave isopod (*Caecidotea serrata*).

Alley Spring Natural Area consists of 340 acres of land owned and managed by the National Park Service as part of the Ozark National Scenic Riverways and 455 acres of land owned and managed by the Missouri Department of Conservation as part of the Angeline Conservation Area. This natural area will be jointly managed by the Conservation Department and the National Park Service. Management work will focus on protecting the cave and karst resources of the area and applying prescribed fire to glade and woodland natural communities. On Conservation Department lands, degraded but restorable dry chert woodlands will receive commercial thinning in addition to prescribed burns. The Alley Spring Natural Area nomination was prepared by Victoria Grant and Tim Breen of the National Park Service and Lee Hughes, Lydia Miramontes, Terry Thompson and Mike Leahy of the Conservation Department.

The 110-acre **Auxvasse Natural Area** in Callaway County contains the majority of the largest and most outstanding dolomite glade system north of the Missouri River. This natural feature was identified in 1984 by the Missouri Natural Features Inventory



Yellow coneflower is at the northern edge of its range on the dolomite glades at Auxvasse NA.

Missouri Department of Conservation, Mike Leahy

as “significant.” Since then Greg Gremaud and others with the Missouri Department of Conservation had attempted to purchase this site for its natural area values. In early 2006 this site was finally acquired by the Conservation Department as part of the Reform Conservation Area. This small natural area supports over 220 native plant species including such Ozark plants as yellow coneflower (*Echinacea paradoxa*) and a sedge (*Carex crawei*), both at the northern edge of their range in the state. Management efforts will include eastern red cedar (*Juniperus virginiana*) thinning and prescribed fires. Lydia Miramontes, John George and Mike Leahy prepared the nomination.

The 652-acre addition to the Conservation Department’s **Spring Creek Gap Glades Natural Area** in Maries County adds exceptional quality dolomite glades and dry chert woodlands to the 40-acre original natural area nominated by Rick Thom in 1982. This 692-acre area is representative of a woodland hills landscape of the Gasconade River Hills Subsection. Gnarled, open-grown post oak (*Quercus stellata*), chinkapin oak (*Quercus muhlenbergii*) and white oak (*Quercus alba*) over 120 years old are scattered across the area’s dry chert and dolomite woodlands. Restoration efforts will move the natural quality from “exceptional” to “significant” and include thinning and prescribed fire. Jeff Demand, Lydia Miramontes, John George and Mike Leahy prepared the nomination. ▲



Post oaks over 120 years old are scattered throughout extensive dry chert woodlands with dolomite glade openings at Spring Creek Gap NA.

Missouri Department of Conservation, Mike Leahy

Paul Nelson chosen Wildlife Conservationist of the Year

Conservation Federation of Missouri (CFM) has awarded their 2006 Wildlife Conservationist of the Year award to Paul Nelson, Mark Twain National Forest ecologist and long-time member of the Missouri Natural Areas Committee (MONAC). The Wildlife Conservationist of the Year Award is given to someone making a significant contribution to the management and restoration of wildlife.

Nelson was recognized March 16, 2007, at CFM's annual banquet for revising the Terrestrial Natural Communities of Missouri classification system. As a MONAC member since 1979, Nelson was assigned to head up a special task force to revise the system.

The Bonnots Mill resident retired from a career as chief of operations and resource management for Missouri Department of Natural Resources (DNR) before joining Mark Twain National Forest, headquartered in Rolla. During his tenure at DNR, Nelson was instrumental in developing the classification system used to inventory, assess and track remaining examples of Missouri's natural areas. The work resulted in publication of *The Terrestrial Natural Communities of Missouri*, a 550-page, full-color compendium of the state's biological diversity. Nelson's book is used by the Missouri Natural Heritage Database housed in Missouri's Department of Conservation to track the status of natural communities and help set future protection goals. The book also served as the framework of Mark Twain National Forest's 2005 Forest Plan and is used as a textbook by University of Missouri's School of Natural Resources.

Conservation Federation of Missouri Awards Committee Chair Ann Kutscher also recognized Nelson for his contribution illustrating many popular Midwestern plan guides including the Trees of Missouri, Shrubs and Woody Vines of Missouri, Ferns of Arkansas and Illustrated Flora of Illinois.

Nelson's wife Linda, daughter Heather, son-in-law Al Duffield, son Travis and friend Haley Wansing and

granddaughter Megan also attended the award ceremony. Paul accepted the award on behalf of the Missouri Natural Areas Committee.

Courtesy of USDA Forest Service, Mark Twain National Forest



Paul Nelson, left, Mark Twain National Forest ecologist, receives the 2006 Wildlife Conservationist of the Year award from Don Johnson, Conservation Federation of Missouri president. Paul's son, Travis (center) joined his father at the ceremony.

Missouri Department of Conservation, Jim Low

COMMENT FROM THE EDITOR...

This issue concludes a two-part series focusing on aquatic natural communities. We hope it has been of value to you. Looking ahead, the Fall 2007 issue will explore histories of various natural communities, geophysiography of springs, marketing natural community management, ecological monitoring and more. Also, the Natural Areas Newsletter is now available online at www.mdc.mo.gov/12220. By summer of 2007, we hope to have links in place so you will be able to access the newsletter from websites of all Missouri Natural Area Program partners.

You will find a subscription information update form on the last page of this newsletter. Please complete this

postage-paid form and return it to us. To better serve you, reduce production costs and make it easier to share with friends and colleagues, we will soon be providing an online subscription option, so that you can obtain your newsletter electronically. For the time being, we will continue production and distribution of hard copies, but our long-term goal is to produce and distribute newsletter copies primarily, if not exclusively, by electronic means. Your return of the form will help us accomplish these goals and improve service to you.

Wayne Porath, Editor



MISSOURI Natural Areas

N E W S L E T T E R

Spring 2007

Calendar of Events

August 5-10, 2007

ECOLOGICAL SOCIETY OF AMERICA/ SOCIETY FOR ECOLOGICAL RESTORATION JOINT MEETING

San Jose McEnery Convention Center, San Jose, Ca.

www.esa.org/sanjose

Theme: Ecology-based restoration in a changing world

August 24-25, 2007

MISSOURI BIRD CONSERVATION INITIATIVE CONFERENCE

Holiday Inn Select, Columbia, Mo.

www.mobci.org

September 2-6, 2007

AMERICAN FISHERIES SOCIETY 137TH ANNUAL MEETING

Marriott Hotel, San Francisco, Ca.

<http://fisheries.org/sf>

Theme: "Thinking Downstream and Downcurrent:

Addressing Uncertainty and Unintended Consequences in
Fish and Fisheries

September 16-21, 2007

ASSOCIATION OF FISH & WILDLIFE AGENCIES ANNUAL MEETING

The Galt House Hotel and Suites, Louisville, Ky.

www.fishwildlife.org/annualmeet.html

Theme: Developing proactive strategies for wildlife
management in the 21st century.

September 22-26, 2007

THE WILDLIFE SOCIETY 14TH ANNUAL CONFERENCE

Tucson, Az.

www.wildlife.org/conference/index.cfm

Theme: Across the Borderline: Challenges and
Opportunities for North American Wildlife Conservation.
Plus many workshops, symposia and field trips.

October 9-12, 2007

34TH ANNUAL NATURAL AREAS CONFERENCE

Cleveland Marriott at Key Center, Cleveland, Oh.

www.naturalarea.org/07conference

Theme: Some Assembly Required: Preserving Nature in a
Fragmented Landscape. Includes plenary sessions, symposia,
contributed oral and poster presentations and field trips.

October 13, 2007

9TH ANNUAL ENDANGERED SPECIES WALK/RUN

Jefferson City, Mo. on the Katy Trail.

www.mdc.mo.gov/programs/es_walkrun

Theme: Featured species of the bottomland forests and swamps.

December 9-12, 2007

68TH MIDWEST FISH & WILDLIFE CONFERENCE

Monona Terrace Convention Center, Madison, Wi.

www.midwest.ncd-afs.org

Theme: "Be the Change: Manage Locally, Conserve Globally"

January 27-February 1, 2008

61ST ANNUAL MEETING OF THE SOCIETY FOR RANGE MANAGEMENT, JOINT MEETING WITH THE AMERICAN FORAGE & GRASSLANDS COUNCIL

The Galt House Hotel and Suites, Louisville, Ky.

www.rangeland.org

Theme: Building Bridges: Grasslands to Rangelands

January 30-February 1, 2008

MISSOURI NATURAL RESOURCES CONFERENCE

Tan-Tar-A Resort, Lake of the Ozarks, Mo.

www.mnrc.org

Theme: Get Ready for Change: Ensuring Resource
Sustainability in an iPod® World.

February 13-16, 2008

4TH INTERNATIONAL PARTNERS IN FLIGHT CONFERENCE

McAllen Convention Center, McAllen, Tx.

www.partnersinflight.org

Theme: "Tundra to Tropics: Connecting Birds, Habitats and People"

Editor: **Missouri Natural Areas Newsletter**
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Missouri Department of Conservation
P.O. Box 180
Jefferson City, MO 65102-0180



MISSOURI Natural Areas NEWSLETTER

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Invitation from the editor: Readers are encouraged to send comments about the *Missouri Natural Areas Newsletter* to Wayne.Porath@mdc.mo.gov so that the newsletter can best serve your needs.

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For a free copy of the *Missouri Natural Areas Directory*, write to Mike Leahy, Natural Areas coordinator, at the address above.



Dear *Missouri Natural Areas Newsletter* Reader:

We need to hear from you!

The *Missouri Natural Areas Newsletter* keeps you aware of what is happening with the Missouri Natural Areas Program. Twice annually, you will find a variety of articles related to classification, designation, restoration, monitoring, and enjoyment of Missouri's broad array of natural terrestrial and aquatic communities and geologic features. We want to keep you up to date on these programs. Another goal is to build and maintain an informed group of natural area enthusiasts.

Don't let this be your final issue!

If you would like to continue receiving the *Missouri Natural Areas Newsletter*, please check one of the boxes below, fill out the return address on the opposite side of the post-card and mail it to us by **September 1, 2007**.

☐ I wish to access the newsletter on-line, after receiving notification by email.

My email address is: _____

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We look forward to hearing from you by September 1, 2007.



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